ETOLO TRAPS: TECHNIQUES AND CLASSIFICATION

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Trapping wild animals to eat is a major technological mode among Etolo people, Southern Highlands Province, Papua New Guinea. Deadfall traps, drop-log tree traps and spring snares used to capture mammals and cassowaries are illustrated and described with reference to their structure, targetted species and the locations where they are built. The classification of different trap types by Etolo is briefly summarized.

☐*Papua New Guinea, Etolo, ethnoclassification, hunting, trapping, mammals.*

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Ethnographic literature from Papua New Guinea includes many references to traps and trapping (e.g. reviews of Anell, 1960; and Bulmer, 1968, 1972; also Barth, 1975; Clarke, 1971; Cranstone, 1972; Herdt, 1981; Kelly, 1977; Pospisil, 1963; Rappaport, 1968; Williams, 1940). Most are incidental reports. A detailed account of trapping techniques is not available from any Papua New Guinean society. Nearly all reports are placed within and, indeed, indexed under a broad category of hunting. In this they understate both the importance of trapping in some societies and the contrasting technologies that underlie trapping and hunting respectively.

This paper attempts to fill a gap. By describing traps and their classification in one society it encourages recognition of trapping as a major technological mode. The people are Etolo. They live on forest-clad mountain slopes rising from the northern edge of the Great Papuan Plateau, Southern Highlands Province. For them and their Onabasulu and Kaluli neighbours on the Plateau trapping mammals provided a useful contribution to diet (Ernst, 1984; Kelly, 1977; Schieffelin, 1975).

During 15 months in 1979-80 I lived with Etolo people at the village of Bobole (population 109, altitude 1100 metres). Through a 52 week period, game mammals (i.e. mammal species greater than 250 gm) contributed an average of 6 grams protein (i.e. 36.2 grams edible portion) per person per day. This was slightly more than half the protein people obtained from animal sources. Of more importance, game mammals provided the most regular input of animal protein. During 13 four-week periods the average daily quota of protein from game mammals was between four and nine grams per person (Dwyer, 1985). Mammals that had been trapped comprised between 36 and 40 percent of a total of 1802 game mammals; they contributed approximately 35 percent of the protein obtained from this source.

The Etolo built several different sorts of traps; deadfalls on the ground, tree traps and spring snares. (The term *sumiti* was used to specify capture of an animal by trapping). These different types were designed to obtain different game. Deadfalls took many bandicoots (species of *Peroryctes* and *Echymipera*) and wallabies (*Dorcopsulus vanheurni*); tree traps took many Stein's cuscus (*Phalanger interpositus*) and most snares were built to capture dwarf cassowaries (*Casuarius bennetti*). (The people did not use traps to capture small birds). Of 34 species of game mammal taken in a 12 month period 26 were obtained in traps. Trapping produced more than 50% of the captures of 10 species and was the most important technique of capture of three other species. Further details of the mammalian species captured and of the seasonality of trapping appear in other papers (Dwyer, 1982a, b; see also Dwyer, 1983; and Kelly, 1977, for accounts of Etolo hunting and subsistence practices respectively). Here I describe the traps themselves and their classification by Etolo; collectively they were named *sane*.

DEADFALL TRAPS

A short avenue of stakes lying either side of a longer drop log comprised the gross structure of a deadfall trap (Fig. 1). At the 'head' end (*pusa mea*) the log projected only a short way beyond the avenue, at the 'tail' end (*hope mea*) it projected some distance. At the head end the line of stakes on one side of the avenue terminated with a forked stick; this was taller than other stakes and sloped inwards across the open space of the avenue. In appearance the structure was a miniature gloomy forest, as indicated by the Etolo name of *itiliba* —

the forest way — for the fatal pathway running between the stakes. Indeed, with abandoned deadfalls the effect might be enhanced because disuse transformed many stakes into regenerating leafy saplings.

A stout branch, the hoist rod, perhaps a metre long, rested within the arms of the forked stick; a short, robust, loop of vine around this lifted the head of the drop log 60 to 80 centimetres above the ground. The log sloped gently downwards through the avenue, pivoted on its tail. A second loop, longer and of delicate construction, encircled the hoist rod towards the rear. This was pulled downwards. Its free end passed outside the avenue of stakes, always on the same side as the fork, and inside and beneath the apex of an arched limb whose ends were thrust immovably into the ground. The arch ran parallel to the stakes about 10 centimetres from them. Here the loop passed around the tip of a short, vertical, toggle holding it firmly against the outside rim of the arch. The free end of this toggle was being tugged towards the avenue but its movement was prevented by the critical trigger stick; a slender rod held in place at one end by the lower part of the toggle and at the other end by the far wall of the avenue. Thus the trigger stick passed through a small gap between two stakes on the side of the avenue near the arch, crossed the avenue a few centimetres above the ground, and rested against the smooth face of an upright stake on the other side. It had to be able to drop freely. The deadfall trap was now set. The intended victim need only dislodge the trigger stick to seal its fate. The toggle was freed, catapulting the hoist rod fowards and dropping the hefty log to pretenderize as it killed the unfortunate beast. The catch could be retrieved at leisure and the fallen log once more poised above the 'forest way'. The design of these traps was similar to that reported by Margaret Mead for the Arapesh (Ansell, 1960, fig. 25, pp 95–96). The Arapesh trap lacked a toggle; the loop from the hoist rod connected directly to the trigger stick holding it firmly against the apex of the hoop. Without a toggle the trap would be less sensitive.

There were numerous variations of this type of trap. Some were idiosyncrasies. Other concerned the size of the intended quarry or were adaptations fitting the trap to particular circumstances of, for example, terrain or species. Deadfalls might be built either as singles or in series with a low fence running between the individual traps. If as singles, then the quarry was enticed into the trap by offering bait; if in series then bait was unnecessary because the interconnecting fence channelled prey to the desired position. Different baits were used. A portion of sweet potato fixed to the end of the trigger stick, within the avenue, would suffice. Though, with such inferior bait, it was best to chew additional sweet potato into mush and spit this along the avenue and near the entrance as attractant. Live baits were more highly regarded; grasshoppers or wood-boring grubs wrapped in neat leaf packages and tied to the trigger. Or, for forest wallabies, the fruit of wild gingers was satisfactory.

The form of the avenue within which the drop log floated was variable. Some people preferred a tall avenue of vertical stakes while others built quite low avenues, perhaps 40 centimetres, with the stakes sloping outwards at a reckless angle. In some traps the two rows of stakes formed all but solid walls and in others the avenue looked careless with numerous gaps. To my knowledge these differences did not affect the catch. The art was in positioning the trigger stick so it would not jam and in stringing the hoist rod for a finely tuned drop log. In some traps the drop log was on rough ground and levelling poles, or backstops to prevent slip, were used (Fig. 1). Again, if the weight of the log was judged insufficient one or more extra limbs would be laid across it, obliquely or at right angles, towards the rear end. Added weight in this position could be exploited in the sometimes tricky business of steadying the drop log precisely above the floor of the avenue. In one further variant the wall of a garden house formed one side of the avenue and the trap was intended to eliminate a minor plague of thieving rats.

Deadfall traps came in many sizes. The smallest were toys and not intended as anything else. Children made them in idle moments, perhaps in a garden while their parents were weeding. Beside hunting shelters in the forest small children, aided by their parents or an older brother, built larger though still insubstantial models; a drop log a metre long, 10 centimetres thick, could kill a small forest rat. Scattered through gardens, in regrowth near houses or near campsites in the forest were recent and rotted deadfalls whose purpose was or had been more serious. In these the drop log was two metres long and 15 centimetres thick. It could flatten a little rat and kill bandicoots or the smaller of the giant rats. The irritation of discovering damaged garden crops, the excitement of finding a runway or tell-tale footprints in the forest, were stimuli to build these deadfalls. They were modestly named *ebele sane*, where *ebele* were small mammals, but the unspoken desire was for larger game.

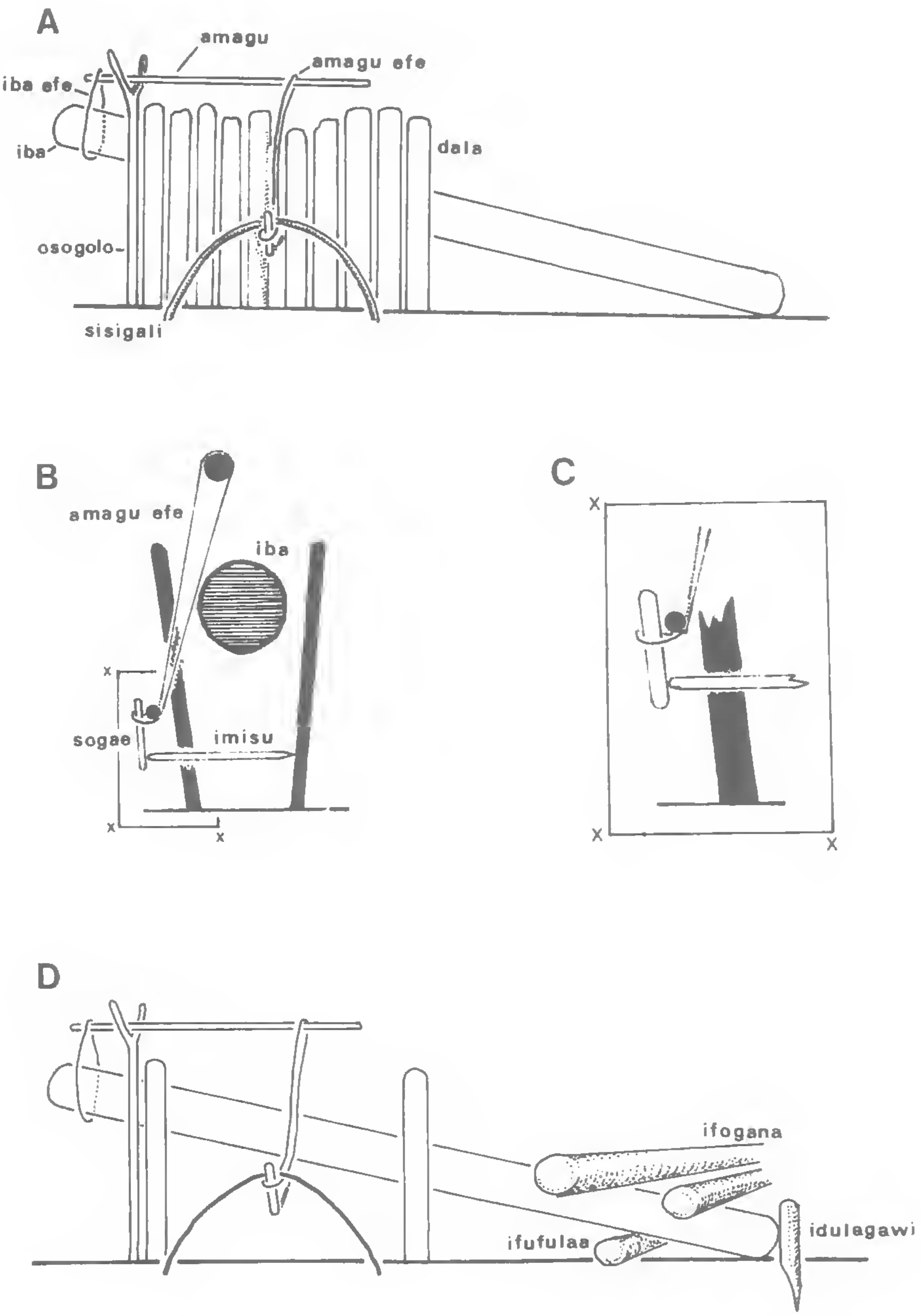

FIG. 1. Deadfall trap. A — plan from side. B — cross- section, enlarged, to show mechanism. C — detail of toggle and trigger stick. D — plan showing ancillary weights, levellers and props. Etolo names for parts are shown on the diagrams. The names are listed hereafter together with their etymology, where known to me, and English equivalents. *Dala* (= fence), avenue; *osogolo* (= forking), forked stick; *sisigali* (= bending into an arch or hoop), arch; *iba* (*i* = tree or log, *iba* not known), drop log; *iba efe* (*efe* = rope), support loop for drop log; *amagu*, hoist rod; *amagu efe*, loop from hoist rod to toggle; *sogae*, toggle; *imisu*, trigger stick. Logs or limbs used to provide added weight and as levellers or props are named, respectively, as *ifogani, ifufulae* and *idulagawi* in Etolo; these terms are probably directly descriptive of function.

In the vicinity of Bobole I located 45 deadfall traps that would qualify as *ebele sane*. Nineteen were in gardens, one in a pandanus orchard, 12 in regrowth forest close to the village and 13 in primary forest. Fifteen of these, three in gardens, seven in regrowth and five in forest, were old and rotting; the remainder were functional though not all in use when I saw them. In one garden there were five, all operating. Of those in the forest six were very close to shelters and seven a short walk away. These latter were spread over 150 metres in a moderately level area of mud soaks and seepages that was crisscrossed by footprints of rats and bandicoots. Two of these traps were functional when found. The others were in varying stages of decay.

Oheo were game mammals and *oheo sane* were designed to take them. These deadfalls were robust in build and thoughtfully placed. The drop log was about three metres long, up to 20 centimetres thick. It might be weighted with ancillary limbs. The immediate environs were often garnished with distractors encouraging the quarry to follow one path. Most of these large deadfalls occurred as series set into drift fences. I saw five that were singletons. One was an ancient, collapsed, deadfall positioned near the edge of a low cliff where an animal climbing the cliff would be likely to reach the top. In better days a short fence had run from either side of the avenue to the cliff edge, embracing the full span of possible routes. The second singleton was on a narrow ridge where a track led to a garden; it was placed centrally within 10 metres of fence running from the edge of a cliff to a large log. An animal travelling down the ridge or close to the log would be led into the entrance of the trap. The remaining three traps were designed for terrestrial cuscus (*Phalanger gymnotis*). They were in regrowth or forest and, at first glance, seemed to be cumbersome, bulky, boxes. They were rugged deadfalls entirely encased in a frame. Even at ground level the earth had been scraped from the floor of the avenue and replaced by a roughly hewn plank. Each of these traps was built with the head of the drop log floating directly over the entrance to an underground lair of a cuscus. The quarry had two undesirable choices; either it remained in its lair and starved or it emerged and triggered the trap. When the catch had been made the trap was temporarily altered. The drop log was raised and fixed in position and an opening broken into one side of the frame near the head end. A limb passed from this opening to low branches or the trunk of a nearby tree and for a period the trap became a lure. A replacement cuscus was 'invited' to take up residence in the now vacant den. When fresh claw marks, droppings, or a familiar smell advertised its presence the frame was closed and the trap reset. I was told one of these traps produced three captures in less than a year.

Series of traps could be either small or large scale ventures. The former were temporary, built at the time new gardens were established and placed within easy access of the path to the garden. They would be operated during a few months in one year and then abandoned. I found two of these; a group of two traps in a six metre fence and a series of five in a 40 metre fence. The shorter set adjoined a stream below a steep gully and the fence ran from the base of a cliff to a thicket in boulders. One third of the fence for the series of five was a log that ran up hill from a stream. One trap was positioned to take animals that passed beneath the log. The rest of the fence and the remaining traps continued up hill beyond the log. Large scale systems were the focus of trapping. They could include more than 40 deadfalls in fences several hundred metres long. They were situated in advanced regrowth or primary forest and were repaired and reused on an annual basis. Fifteen were operated in 1979, one in a desultory fashion, and all but the last had operated at least the previous year. A portion of a sixteenth series, a light weight design built a few years earlier by two youthful brothers, was operated by another family during a few months in 1979 when they prepared a garden nearby. This series was in regrowth, 15 to 20 years old; the fence crossed fairly level land between two streams, a distance of about 60 metres and sufficient at the most for 15 deadfalls. When I saw it only four traps were functional. A new garden had destroyed the remainder.

I saw four of the large series of deadfalls that operated in 1979 and found a fifth, old and collapsed, system. One was in 20 years old regrowth at an altitude of about 1000 metres, two in advanced regrowth abutting primary forest at 1200 metres and two, including the decayed system, in primary forest at about 1400 metres. Information received suggested that all but two of the remaining 11 were in primary forest; one was below the altitude of Bobole, the rest at higher elevations. Two of the five systems examined by me consisted of a long series of traps in a single fence together with one or two ancillary sets nearby. Thus one series, in regrowth, included 18 deadfalls in a fence 109 metres long that crossed a low ridge between two streams. Associated with these, but across and downstream from them, were three more traps in 20 metres of fence that connected a steep drop into the stream with a log. The second of these systems included 36 traps in a fence about 200 to 250 metres long. The fence crossed a ridge from a steep gravel and mud slip on one side to a steep embankment on the other. Several hundred metres away were two groups, each of four traps, in fences 25 metres long. These fences blocked off narrow ridges between steep embankments. One set of four was new in 1979. A third system of 23 traps in 139 metres of fence ran from the edge of a mountain torrent across a gentle incline where, for 30 metres, it was close to a young pandanus orchard. Then it turned steeply up hill to terminate at an embankment. The fourth of the operating systems was the most spectacular. It was in forest and included 36 traps — two were new in 1979 — in 300 to 350 metres of fence. The country traversed was very steep, broken by minor cliffs and crossed by occasional gullies and streams. The fence line twisted and turned up the slope, incorporating fallen logs and cliffs into the structure, until it ended abruptly at a rock face plunging to the headwaters of a torrent. For about 100 metres of the total length there had been no need to build any fence. The collapsed system, overgrown and covered by thickets, had included at least 32 traps in a fence of approximately 250 metres. It ran from the crest of a ridge, down a moderately gentle slope and across a flat to the end of a log. I was told that one other system, which I did not see, included 37 traps. Thus, in six systems, the average number of traps was 32 and in five, the average length of effective fence, though not necessarily of built fence, was approximately 225 metres. At Bobole, people were probably operating nearly 500 deadfall traps in more than three kilometres of fence. Clearly, they were intent upon harvesting available game.

Each of these large systems of traps effectively blocked off routes that animals would regularly traverse. The design of the fence enhanced the chance that an animal would run along it. Fences were irregular in height, usually between 70 and 100 centimetres. They might be of stakes thrust into the ground and tied, at the top, to long horizontal poles fastened between trees. These poles might be separately propped. Or the fence could be more flimsy, consisting of sheets of bark resting against the supporting frame. Along most of their length all fences were inclined as much as 30 degrees from the vertical. The direction of slope switched erratically along the length of the fence but was always aligned with the head end of each trap. An animal running beneath the overhang of the fence passed the gaps that led down the avenues of stakes.

In the two drift-fence systems crossing relatively level regrowth areas trap spacing was fairly regular; in the 18 trap series the traps were from three to 9.5 metres apart (mean 5.8 metres) and in the 23 traps series they were from 2.5 to 12.5 metres apart (mean 5.9 metres). In rough country some traps might be 20 to 30 metres apart. These longer distances occurred at cliff edges or where logs, lying flush with the ground, were part of the fence. Trap design varied both between systems and in accommodation to landscape features. In one system nearly all the drop logs were very heavy, yet the avenues were remarkably flimsy. In the other three systems the drop logs were lighter but were often reinforced by additional limbs placed on top along their length and were weighted by other limbs placed obliquely or transversely. The avenues of these latter systems were of robust construction. Traps were often sited with deliberate reference to natural features. Possible runways beside, between or beneath logs were regularly used or, again, traps were built at places where an animal might scramble across an embankment or small cliff. Some traps were perpendicular to the fence; nearly all of them in one system. Many were angled to the fence and a few were parallel, such that the fence was stepped, taking both sides of the avenue into its structure. Some of these designs are illustrated in Figure 2.

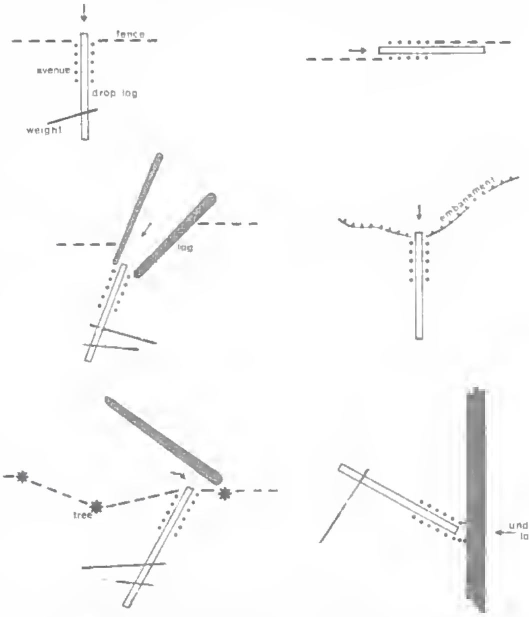

FIG. 2. Designs for the layout of some deadfall traps. Arrows show direction of entry into avenue.

Within the avenues the trigger sticks were usually set about four centimetres above the ground. They were sufficiently rigid that small rats could not dislodge them, and were usually camouflaged by dead leaves or a fern frond.

The *segeligi sane* was the *pièce de résistance* of Etolo traps. It was to trap wild pigs. The two I saw were at lower altitudes than Bobole though one belonged to people from Bobole. The design of one is sketched in Figure 3. The avenue of carefully hewn poles stood 1.67 metres high, was 2.5 metres long and two-thirds of a metre wide. The 'drop log' was of five or six logs and some smaller limbs. These were bound tightly together as a single massive structure five metres long, 25 centimetres thick, occupying the full width of the avenue. To hoist this into the air called for adaptation of the mechanism. A forked pole was present on each side at the head of the avenue. Another pole rested horizontally within the arms of these forks and the hoist rod, two metres long, pivoted centrally on this. A rope around the front of the hoist rod supported the drop log. At the rear the hoist rod was held down by another rope passing from one side of the avenue, where it was securely fastened near the base, to the other side where it connected to the trigger mechansism. A stout frame corresponded to the arch of a conventional deadfall trap. The rope passed outside this and immediately turned inwards beneath it. Here

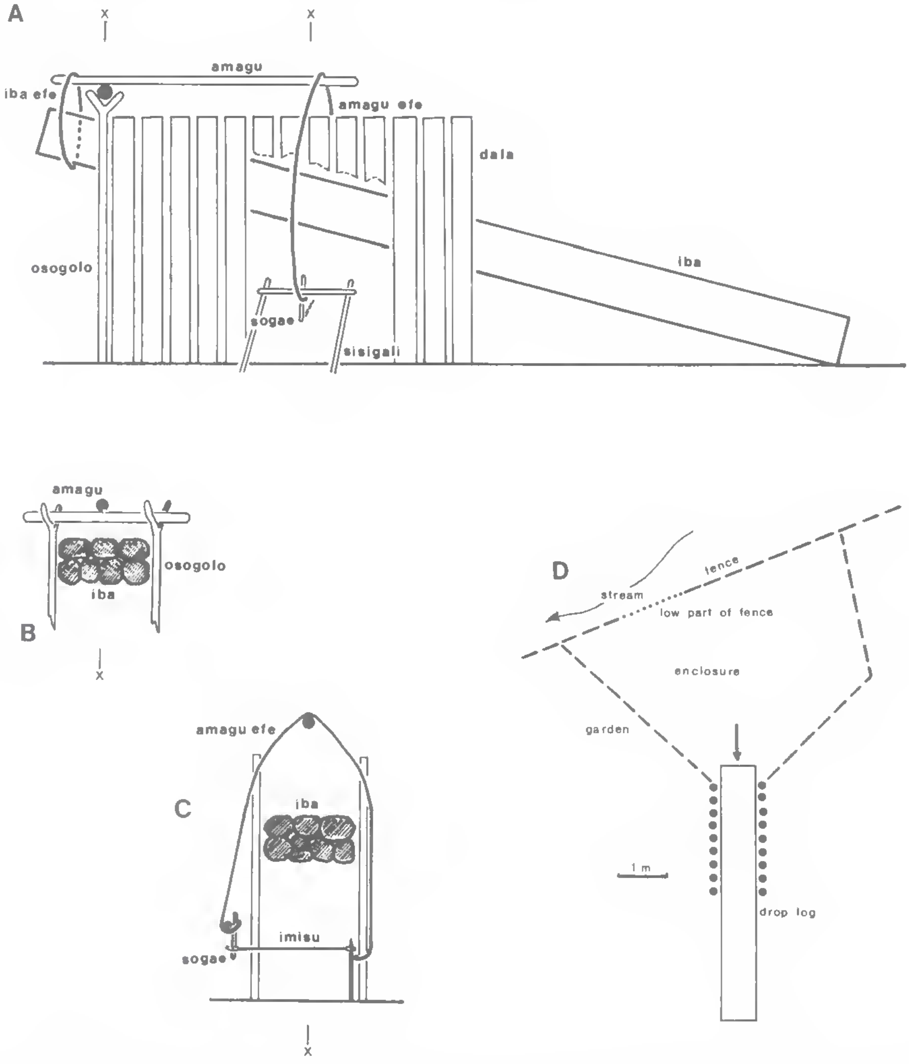

FIG. 3. A deadfall trap designed for wild pig. A — plan from side with part of the avenue removed. B and C — cross-sections. D — plan of layout for a large deadfall. Labelling is as for Figure 1.

it was fastened to a portion of limb, about 20 centimetres long and two or three centimetres thick, that it held firmly against the inside rim of the cross piece of the 'arch'. Tension on this toggle would drag its lower end outwards, away from the avenue, rather than inwards as in the standard design. This movement was prevented by the 'trigger stick' — a taut rope, nearly one centimetre in diameter, which was tied to the peg on one side, passed across the avenue, and looped over the top of a carefully prepared stake. This stake was thrust deep into the ground near the far wall of the avenue. A pig passing beneath the taut rope would lift it free from the sharpened tip of the stake to release the drop leg. In this particular trap the trigger was set so high I imagined the system to be currently inactivated. I was wrong. It was designed to take a particular pig and that pig only, a huge wild boar that ravaged the small garden into which the trap led. Kabi of Ingiribisado, who owned the garden, said it did not matter if other smaller pigs sauntered happily beneath the trigger to his crops. In fact, this was an unlikely event. The pig in question had previously broken part of the garden fence where this ran beside the edge of a stream. Kabi had repaired much of the fence but had left a gap sufficient for a powerful pig to cross. If it did so it entered a newly built and strongly fenced enclosure that offered immediate escape through the deadfall trap (Fig. 3).

The second *segeligi sane* was in a sago grove and intended to protect sago grubs that were being incubated nearby. The rear end of the drop log and all the exterior mechanism were caged to prevent triggering by disturbance from outside the trap. Sago pith was scattered near the entrance and in the avenue, with a large amount at the rear where the drop log came down to the ground. To reach this bait a pig would have to worry a horizontally placed forked stick from its position. This was the trigger stick.

TREE TRAPS

The design of tree traps was more intricate than that of other Etolo traps. They required greater skill and more time to manufacture. Figure 4 illustrates basic features of the mechanism (A,B) and of the elaborately woven cage that formed a shallow supporting basket (C) and walls (D) for the trap. A horizontal pole linked two trees, perhaps across a track, as an aerial roadway for an animal. Height above ground varied but was typically between two and four metres. The roadway lay within the arms of a forked pole that was thrust into the ground and often steadied by props and a climbing frame. A rod was fastened across the arms of the fork, near their tips; on either side it projected a short distance beyond the arms. The cage, which would house the mechanism, was woven from two lengths of vine. One was for the walls (see Fig. 4D). It took the form of a series of two, three or four elongate and tightly concentric loops centered beneath the horizontal roadway and folded upwards to pass over the ends of the rod where this projected beyond the arms of the fork. The basket (or base) of the cage was woven from a single vine as a series of concentric arches that curved outwards and upwards on either side of the roadway (see Fig. 4C). These arches were tightly looped around the roadway on opposite sides of the fork. Here they were secured by a 'holdfast rod', at least as long as the cage, that was bound to the roadway, about one centimetre above it. In some tree traps the walls were made first and the basket followed; in others the two portions were interwoven. The fork was positioned centrally within the finished cage which might be 40 to 50 centimetres high, 60 to 70 centimetres long and 20 to 25 centimetres wide.

Three nooses of either cane or bamboo were positioned within the cage, about 10 centimetres apart, with slip knots lying between the holdfast rod and the roadway (see Fig. 4B). The free ends of these nooses were attached to the middle of the drop log. This was about a metre long by 15 centimetres thick. It was suspended to one side of the cage and a few centimetres below it. A loop of cane tied to the middle of the drop log passed above one end of the transverse rod linking the arms of the fork (see Fig. 4A). It held the tip of a moderately long toggle against the rod. The trigger stick lay across the cage above the level of the basket. It might be concealed beneath leaves and was placed so an animal moving through the nooses would step onto it. On one side of the cage, opposite the drop log, the trigger stick was connected by a light vine to the rod lying between the arms of the fork. On the other side it was placed between the toggle itself and the loop of cane that connected the toggle to the drop log. The orientation of toggle and loop were such that pressure from the former, derived ultimately through the drop log, wedged the trigger stick firmly against the loop. It could not move in the horizontal plane but was free to be moved in the vertical plane. This occurred if an animal travelling along the roadway stepped onto the trigger stick, pushing it below the level of the toggle to release the drop log and thereby close the nooses.

I located 23 tree traps that were functional or had functioned during 1979. They belonged to 10 or 11 men or families but were not the full complement of tree traps used by these people. Eight or nine other men or families also operated tree traps and I estimate that between 50 and 75 tree traps were in use during the year. Tree traps suffered from use. Before they died captured animals chewed through the vines of the cage and nooses were pulled out of alignment. The life of the trap, particularly if it was successful, might be a few months only. Two built in August had broken down by mid-December and mid-January respectively. Certainly, none could be repaired and used in more than one year. Thirteen of the traps I saw were situated above tracks, usually in 10 to 20 year old regrowth, in the neighbourhood of gardens. Trees overhanging the track often had been slashed for 20 to 30 metres in both directions to restrict possible crossing places to the artificial roadway provided by the trap. In one trap the roadway gave access to a potential den site in a hollow stump but all others were in foraging rather than resting situations. Ten of the tree traps were

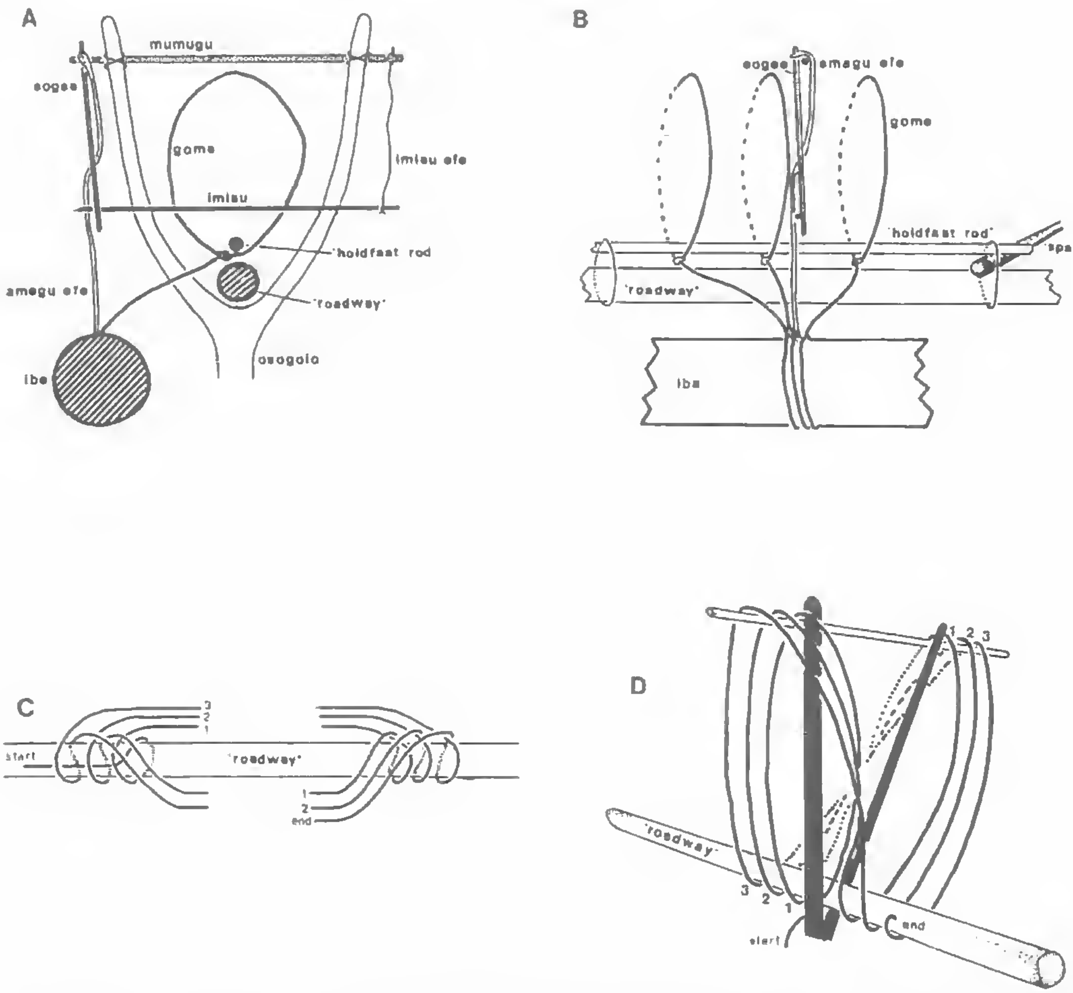

FIG. 4. Tree trap. A — cross-section through primary vertical support. B — plan from side. In A and B the rope work of the basket and walls of the cage are omitted. The designs for this rope work are shown in C and D respectively. Etolo names, where known, are shown on the diagrams. They are listed hereafter together with English equivalents. *Osogolo*, forked stick; *mumugu*, rod connecting arms of forked stick; *iba*, drop log; *amagu efe*, loop passing from drop log to '*mumugu*' and held by the toggle; *sogae*, toggle; *imisu*, trigger stick; *imisu efe*, light length of vine from trigger stick to '*mumugu*'; *gome*, noose. I did not learn Etolo names for the parts labelled 'runway' and 'holdfast rod'.

in forest and made use of natural runways above gullies or streams. Several were on or close to routes taken by people when they were visiting their deadfall traps. In three of these forest traps the runway — either a slender branch or vine — was built into the roadway of the trap. In four others, all on the banks of a stream, the trap was close to the trunk of a tree; a branch arching across the stream from the opposite bank was bound to the end of the roadway furthest from the tree, while the end nearest the tree was expanded as a small platform of branches and leaves, presumably offering the animal a comfortable place from which to embark on its crossing. The remaining three of these forest traps were built on logs that lay across streams a few metres above the water.

I found three collapsed tree traps dating from 1978; all were in areas of regrowth and crossed tracks leading to gardens. In addition, early in 1980, I located five exploratory efforts. These consisted of either a tentative roadway positioned in its forked pole or the roadway alone. All were in regrowth. They were intended to be adopted as convenient runways by animals. Claw marks on the roadway, or droppings beneath it, would show when the roadway was in use and prompt construction of the trap itself. I was told preliminary efforts of this sort were a regular practice. One of these trial roadways was established in February but no trap had been built by April. The others were seen in April.

SPRING SNARES

Springs snares, built to take cassowaries, had a deceptively flimsy appearance. This was because they were almost entirely mechanism with very little housing. Figure 5 illustrates the design of a cassowary snare. The housing consisted of two slender poles or saplings tied to form an 'A-frame', about 60 centimetres wide at the base and 80 centimetres high. This frame straddled a likely or known runway of an animal. A strong, pliant sapling three or four metres away was trimmed and bent down towards the apex of the 'A'. A loop of vine fastened to this passed beneath the apex to hold the toggle which, in turn, exerted force on the horizontal trigger stick — the high set cross-piece of the 'A' — holding it firmly against the legs of the frame. Another length of vine, which had to be strong though slender, connected the trigger stick to a root or rock at ground level. This thread would catch in the feathers of a cassowary that stooped to pass under the frame and would pull the trigger stick free from the toggle to spring the trap. A noose of cane or bamboo lying within the frame, with its free end tied to the sprung sapling, was drawn tight as the released sapling swung rapidly upwards. This noose rode 20 to 25 centimetres above the ground and was itself about 40 to 45 centimetres high by 35 centimetres wide. It was tied onto the frame by short lengths of vine designed to break under strain. The trap was completed with a rough barrier of dead sticks and small saplings extending a few metres either side of the frame. This cut off alternate routes around the snare. In appearance the barrier was an inconsequential, almost trivial, structure; it hardly befitted the talents of trappers whose purpose was serious. A cassowary could push through it effortlessly. I can only conclude the birds were easily led, being disinclined to step through minor barriers, or were very wary, avoiding paths that showed signs of overt interference.

The four cassowary snares I saw were in forest.

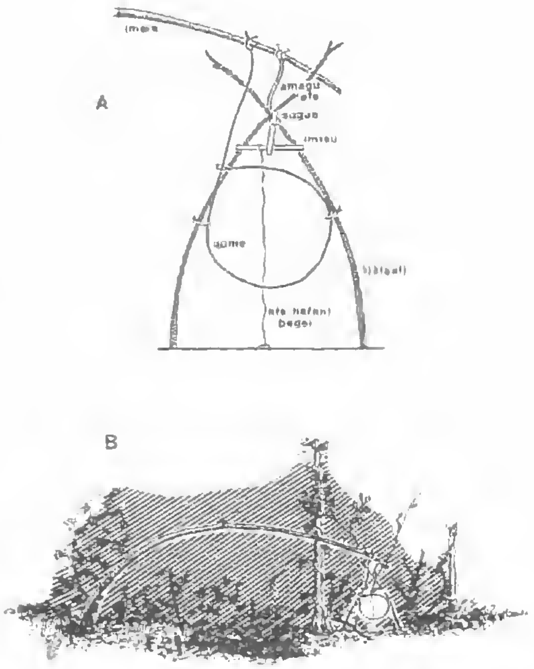

FIG. 5. Spring snare. A — plan excluding the sprung sapling. B – sketch to show snare set in forest. Etolo names for parts are shown on diagram A. They are listed hereafter together with English equivalents. *Sisigali*, supporting 'A' frame; *imele*, sprung sapling; *amagu efe*, loop passing from *imele* beneath the tip of the 'A' frame; *sogae*, toggle; *imisu*, trigger stick; *efe nefani hegei* (= string, not too small, holding), slender but strong vine running from trigger stick to a rock or branch on the ground; *gome*, noose.

Two were slightly to one side of the crest of a ridge where this fell away very steeply. A human trail followed the ridge and both snares were at places where an animal following the path might turn off the ridge or where an animal coming up the slope would be channelled by embankments and cliffs towards the ridge. The other two snares were at small streams. Both were built across infrequently used human trails at places where topography restricted the choice of routes across the streams. I am uncertain how many cassowary snares may have been set in 1979. At least six men operated them and one had built four or five. I was told megapodes were occasionally taken in cassowary snares.

There were two other varieties of spring snare. One was a miniature built on the known runway of a game mammal and the second a robust model for wild pigs. The former type was rarely made by Etolo. The only one built in 1979 was the work of a Huli pastor then living at Bobole. The low fence either side of the snare was of strong stakes. No pig snares were built. The only difference between a pig and a cassowary snare, apart from the more powerful construction of the former, was the addition of a rope from the sprung sapling to a nearby tree. This provided an emergency holdfast should the captured pig be able to uproot the sapling.

CLASSIFICATION

Figure 6 records major themes of Etolo classification of traps. The taxonomy had four levels. At higher levels named categories conformed to formal models of taxonomic structure in being exclusive. At the lower level of the taxonomic hierarchy traps were classified using cross-cutting criteria and category exclusiveness broke down.

Sane was the Etolo word for trap. A few simple devices used to lure animals into confined quarters were excluded from this notion. A *sane* had working parts; the quarry effectively suicided by operating a trigger. The first separation of traps was into those that did and those that did not incorporate a drop log. The former were also named *sane*; the latter were *gae* or *gae sane*. Deadfall and tree traps comprised the first category, spring snares comprised the second. For Etolo the criterion of separation concerned the action of the trap after it had been triggered. They described the release action of a *sane* (restricted usage) as "quickly fall down" and of a *gae sane* as "quickly go up". The contrast between logs, in deadfalls, and nooses, in tree traps and spring snares, as the instruments of death was not a taxonomic marker.

Sane, in restricted usage, were further separated as *dala sane*, or *nagataia sane*, (i.e. deadfalls) and *efe sane*, or *ilibia sane*, (i.e. tree traps). *Dala* was one word for a fence and here referred to the two lines of stakes which formed the avenue of a deadfall. *Efe* was string or rope and referred to the rope work of the cage of the tree trap. *Nagataia* ('ground on') and *ilibia* ('tree above') referred to the locations of deadfalls and tree traps respectively.

Within each of the three categories of trap defined above (i.e. *dala sane*, *efe sane* and *gae sane*) further distinctions were based in either the location or form of the trap or the sorts of animals it was designed to catch. Cross-cutting categories were formed by these distinctions. To Etolo the context of communication was more important than taxonomic precision. Thus, for *dala sane*, two sets of subordinate categories may be recognised — at least by the analyst! The first concerned the sorts of animals being pursued, the second gave information concerning the location or form of the traps. In the first case *ebele sane, oheo sane, hatagaui sane* and *segeligi sane* were designed, ideally, to capture the sorts of animals named; i.e. small mammals, larger (= game) mammals, terrestrial cuscus and wild pig respectively. In the second case *sege sane, nogo sane, samie sane* and *gogoi sane* were, respectively, isolated deadfalls scattered in regrowth and forest (*sege* = place), deadfalls positioned on the runways of mammals (*nogo* was a Betamini word for path), deadfalls set over the lairs of mammals (*samie* = to sit down and rest) and series of deadfalls within drift fences (the root of *gogoi* connoted down below, at lower altitudes, and the word was used here to denote the low fence hugging the ground and connecting one trap with another). These two sets of terms intersected in various ways. *Sege sane* would usually qualify as *ebele sane* (i.e. small mammal trap) but were readily renamed *oheo sane* if, by chance, they produced larger mammals. *Nogo sane* could include short lengths of fence and thus be *gogoi sane*. These two categories of trap were always *oheo sane* and, in my experience, *samie sane* equated to *hatagaui sane*. *Hatagaui* (terrestrial cuscus) were included within the primary taxon *oheo* and, in this sense, *hatagaui sane* could be regarded as a type of *oheo sane*. I did not hear anyone speak of *hatagaui sane* in this way and suspect the taxonomic finesse my words imply was neither of importance nor interest to Etolo. *Gogoi sane* were also regularly named *sane yafi* or *sane*

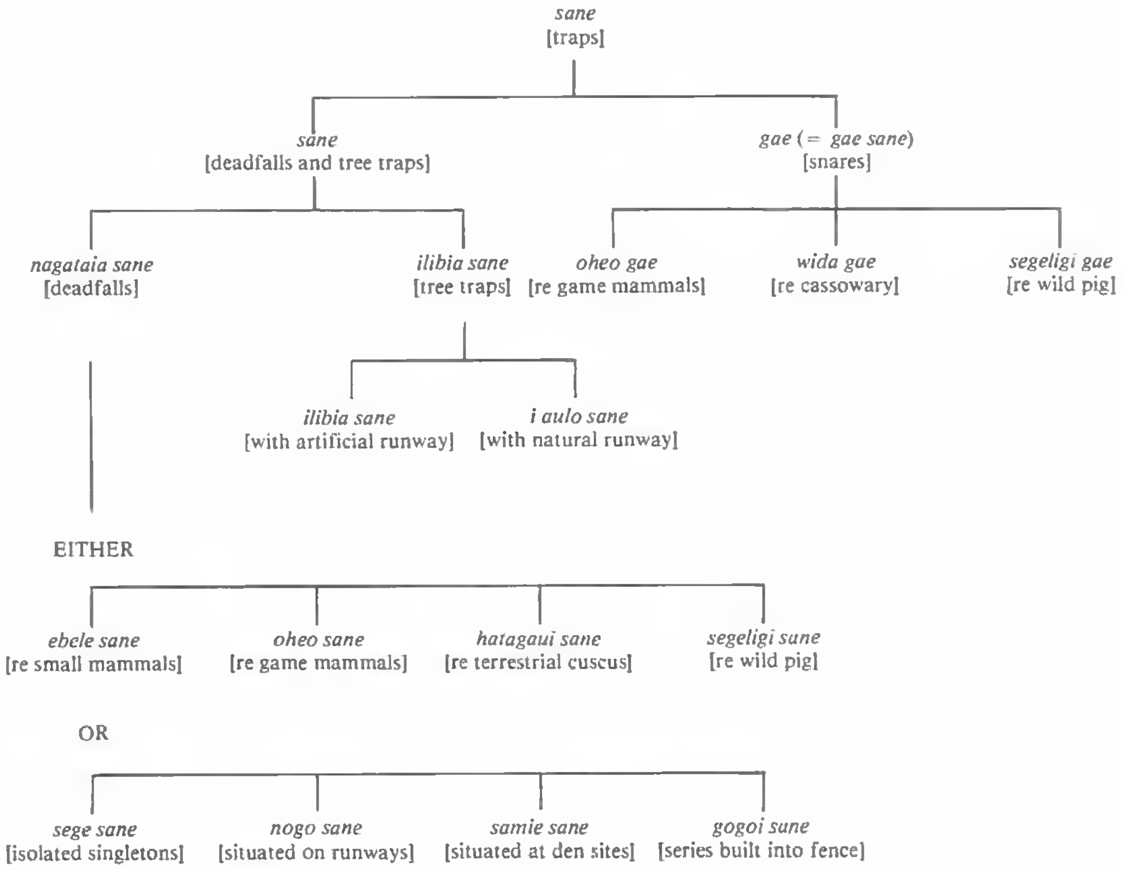

FIG. 6. Etolo classification of traps.

fani, many traps or true traps, and on one occasion a system of traps was named *yala sane* where *yala* was a term for a garden fence. *Iti sane* was occasionally used instead of *nogo sane* (*iti* was an Etolo word for path). *Afate sane* ('one trap') was often used for single deadfalls, and, in this way, contrasted with *sane yafi* ('traps many').

Tree traps (*efe* of *ilibia sane*) were divided as *ilibia sane* (those in which the arboreal runway had been made by people) and *i aulo sane* (those incorporating natural runways such as logs across streams; *aulo* referred to 'bridges' of this sort). Spring snares (*gae*) were classified as *oheo gae*, *wida gae* and *segeligi gae* according to the intention to obtain game mammals (*oheo*), cassowary (*wida*) or wild pig (*segeligi*) respectively. Snares for cassowary were sometimes *wida sane* and both *oheo gae* and *wida gae* could be *nogo gae* if they had been built across a runway.

The legends to Figures 1 and 3 to 5 list Etolo names for parts of traps and record the etymology of those names when known to me. Several comments are warranted. First, there was an elaborate lexicon describing the anatomy of traps. Second, functionally analagous parts were nearly always given the same name in different types of traps. In this regard the following are noteworthy. (a) In the spring snare the loop of vine connecting the sprung sapling to the toggle was named *amagu efe* (hoist rod string) despite the absence of a hoist rod in the snare. (b) In deadfalls built to capture game mammals and wild pigs and in spring snares the rather different structures that held the upper tip of the toggle in position were all named *sisigali*. Only in smaller deadfalls did the word *sisigali* ('bending into an arch or hoop') describe the form of the structure to which it referred. In the snare the use of *sisigali* for the entire 'A' frame stretched the literal meaning of the term and stressed only a part of the function of that frame. In tree traps the functional analogue of the *sisigali* was reduced to a slender rod and named *mumugu*. (c) The *osogolo* (forked stick) of tree traps was not functionally analagous to that of deadfalls. Third, I was unable to elicit etymological information for the Etolo names given to drop log, hoist rod, toggle, trigger stick or noose (s) in any traps; these were the key functional components of the traps.

COMMENT AND SPECULATION

The preceding account of traps, their classification and of names for parts of traps reflects a considerable role for this technological mode. Certainly, through the 12 months where I have data, mammals that were trapped provided a useful amount of protein; in some months they provided most of the animal protein that people received. Both the taxonomy of traps and the anatomical lexicon hint that deadfalls were the most salient traps in Etolo conceptions. Both deadfalls and tree traps were widely used by people living on the Great Papuan Plateau but only snares were employed by their highland neighbours, the Huli. Spring snares were more cryptic than deadfalls and required more care to manufacture. They had also to be placed with more careful attention to runways used by animals. Where faunal abundance has been reduced in consequence of human impact upon habitat trapping with deadfalls, which are often placed with scant attention to the habits of particular prey species, may be less effective than trapping with snares. This opinion fits the little that is recorded concerning distribution of spring snares and deadfalls through Papua New Guinea. From reports that specify the type of trap used for medium sized mammals there seems to be an association between the use of snares and areas of higher population density (e.g. Central Highlands) and the use of deadfalls and areas of lower population density (e.g. Highland Fringe). In areas of lower population density snares may be used for larger game.

The literature is remarkably silent concerning tree traps of the type described in this paper. Perhaps they are hard to see since neither Kelly (1977) nor Schieffelin (1975) noted their existence among Etolo and Kaluli respectively. Or perhaps they are not in common use through Papua New Guinea. These elegant traps combined features of deadfalls and snares. There was no mention of anything like them in Anell's (1960) review. At Bobole 43 of 95 known captures from tree traps were of Stein's cuscus. This species was most abundant in relatively young regrowth forest and there was much of this in the vicinity of Bobole. Tree traps would be most effective if positioned to exploit arboreal runways used by target species. At Bobole this was often achieved by providing the runway (a pole placed across a trail used by people) and eliminating potential natural runways either side of the artificial one. It would be far more difficult to eliminate competing runways in tall primary forest. Perhaps the distribution of tree traps across New Guinea will be found to correlate with those subsistence modes that create large expanses of second growth forest. This may be most likely where the intensification of gardening is at intermediate levels as, for example, where garden produce and starch from sago palms are of similar dietary importance. Thus, it may be more than coincidence that Ellen (1975) reported 'weighted noose traps' (i.e. tree traps) in 'series of up to twenty' used in areas of secondary forest by the Nuaulu of Seram.

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